

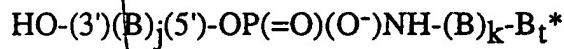
I claim:

1. A method for identifying a sequence of nucleotides in a polynucleotide, the method comprising the steps of:
  - (a) extending an initializing oligonucleotide along the polynucleotide by ligating an oligonucleotide probe thereto to form an extended duplex;
  - (b) identifying one or more nucleotides of the polynucleotide; and
  - (c) repeating steps (a) and (b) until the sequence of nucleotides is determined.
2. The method of claim 1 wherein said oligonucleotide probe has a chain-terminating moiety at a terminus distal to said initializing oligonucleotide.
3. The method of claim 2 wherein said step of identifying includes removing said chain-terminating moiety and extending said oligonucleotide probe with a nucleic acid polymerase in the presence of one or more labeled chain-terminating nucleoside triphosphates.
4. The method of claim 3 further including a step of regenerating an extendable terminus on said extended duplex.
5. The method of claim 4 wherein said oligonucleotide probe includes a subsequence of four ribonucleotides and wherein said step of regenerating includes cleaving said oligonucleotide probe with RNase H.
6. The method of claim 5 wherein said chain-terminating moiety is a 3' phosphate.
7. The method of claim 2 further including a step of capping an extended duplex ~~or~~ said initializing oligonucleotide whenever the extended duplex ~~or~~ said initializing oligonucleotide fails to ligate to said oligonucleotide probe.

- ✓
8. The method of claim 2 further including a step of regenerating an extendable terminus on said extended duplex.
9. The method of claim 8 wherein said step of regenerating includes 5 cleaving a chemically scissile internucleosidic linkage in said extended duplex.
10. The method of claim 9 wherein said chemically scissile internucleosidic linkage is a phosphoramidate.
11. The method of claim 8 wherein said step of regenerating includes enzymatically cleaving an internucleosidic linkage in said extended duplex.
12. The method of claim 11 wherein said oligonucleotide probe includes 15 a subsequence of four ribonucleotides and wherein said step of regenerating includes cleaving said oligonucleotide probe with RNase H.
13. A method for determining the nucleotide sequence of a polynucleotide, the method comprising the steps of:
- 20 (a) providing a template comprising the polynucleotide;
- (b) providing an initializing oligonucleotide which forms a duplex with the template adjacent to the polynucleotide;
- (c) annealing an oligonucleotide probe to the template adjacent to the initializing oligonucleotide;
- 25 (d) ligating the oligonucleotide probe to the initializing oligonucleotide to form an extended duplex;
- (e) identifying one or more nucleotides of the polynucleotide by a label on the ligated oligonucleotide probe; and
- (f) repeating steps (c) through (e) until the nucleotide sequence of 30 the polynucleotide is determined.
14. The method of claim 13 wherein said oligonucleotide probe has a chain-terminating moiety at a terminus distal to said initializing oligonucleotide and wherein said method further includes a step of regenerating an extendable terminus on said oligonucleotide probe.

15. The method of claim 14 further including a step of capping said extended duplex or said initializing oligonucleotide that fails to ligate to said oligonucleotide probe.
  16. The method of claim 14 wherein said step of identifying consists of identifying a single nucleotide of said polynucleotide.
  17. The method of claim 16 wherein said step of identifying includes removing said chain-terminating moiety and extending said oligonucleotide probe with a nucleic acid polymerase in the presence of one or more labeled chain-terminating nucleoside triphosphates.

18. An oligonucleotide probe of the formula:



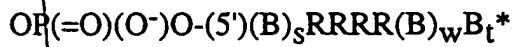
wherein:

B is a nucleotide or an analog thereof;

j is in the range of from 1 to 12;

$B_t^*$  is a labeled chain-terminating moiety.

19. An oligonucleotide probe selected from the group consisting of:



and



wherein:

B is a deoxyribonucleotide or an analog thereof;

13

R is a ribonucleotide;  
s is in the range of from 1 to 8;  
w is in the range of from 0 to 8, such that the sum of j and k is less  
than or equal to 8; *.....*  
B<sub>t</sub>\* is a labeled chain-terminating moiety.

5